

Associate of Applied Science in Industrial Instrumentation & Electrical Technology

Description

This program offers training in the field of instrumentation technology. Students are prepared to be competent, qualified instrument technicians who can meet the ever-changing demands of modern industry. It includes training in electrical and electronic technology, basic programmable logic controllers (PLC's) knowledge and troubleshooting techniques, utilization of measurement sensing devices, control valves, and process control management.

Program Learning Objectives

1. Understand the physics of pressure, temperature, level and flow measurement; mechanical and electrical aspects of instruments used to control dynamics of processes. Dynamics of automatic control including proportional control, automatic reset, derivative action and integral timing conditioning and refrigeration units.
2. Demonstrate knowledge of commonly used process measurement devices, control methods and strategies, and the proper selection, identification, design, installation and operation of instrumentation.
3. Demonstrate knowledge of industrial process valve maintenance and instrumentation, including calibration, configuration, troubleshooting, and use of valves with instrumentation.
4. Demonstrate knowledge of basic fundamentals, terms, and units of DC and AC electrical theory, Graduates will have the ability to use test equipment, and hand tools.
5. Demonstrate the knowledge and ability to develop, construct, and functionally check a process control loop created by the student teams. This is a capstone project for Instrumentation and Electrical Technology students.
6. Create and debug hardware or software components that encompass electrical control systems.
7. Communication Skills - Develop, interpret, and express ideas and information through written, oral and visual communication that is adapted to purpose, structure, audience, and medium.
8. Critical Thinking Skills - Gather, analyze, synthesize, evaluate and apply information for the purposes of innovation, inquiry, and creative thinking.
9. Empirical and Quantitative Skills - Apply mathematical, logical and scientific principles and methods through the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.
10. Personal Responsibility - Identify and apply ethical principles and practices to decision-making by connecting choices, actions and consequences.
11. Social Responsibility (Civic and Cultural Awareness) - Analyze differences and commonalities among peoples, ideas, aesthetic traditions, and cultural practices to include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities.
12. Scientific Reasoning - Apply scientific concepts to explain the natural world.

Curriculum

Course #	Course Title	Lecture/ Lab Hours	Credit Hours	Clock Hours
LEAD 1003	Work Readiness	2/2	3	90
WKSF 1003	Industrial Workplace Safety	2/2	3	90
IJET 1012	Industrial Tools & Calculations	2/1	2	60
IJET 1022	Electrical Circuits Theory and Practice I	1/2	2	75
IJET 1032	Electrical Circuits Theory and Practice II	1/2	2	75
CTC: Industrial Helper			12	390
IJET 1212	Electronic Circuits - Theory and Practice	1/2	2	75
IJET 1222	Electrical Power Theory and Practice I	1/2	2	75
IJET 1232	Electrical Power Theory and Practice II	1/2	2	75
IJET 1243	Industrial Electrical Power Theory & Practice I	2/2	3	90
IJET 1253	Industrial Electrical Power Theory & Practice II	2/2	3	90
CTS: Installation Technician - Level II			24	795
IJET 2014	Control Systems - Theory and Practice	2/4	4	150
IJET 2024	Instrumentation Process Measurement Theory & Practice I	2/4	4	150
IJET 2034	Instrumentation Process Measurement Theory & Practice II	2/3	4	120
CTS: Installation Technician - Level III			36	1215
IJET 2043	Instrumentation Control Systems Theory & Practice I	1/2	3	105
IJET 2053	Instrumentation Control Systems Theory & Practice II	2/2	3	90
IJET 2063	Capstone: Integrated Control Systems Troubleshooting	2/2	3	90
TD - Industrial Instrumentation & Electrical Technician			45	1500
SPCH 1015	Intro to Public Speaking	3/0	3	45
ENGL 1015	English Composition I	3/0	3	45
PHSC 1015	Physical Science I	3/0	3	45
PSYC 2015	Introduction to Psychology	3/0	3	45
MATH 1015	College Algebra	3/0	3	45
HIST 1010 HIST 1020 HIST 2010 HIST 2020	Western Civilization I or Western Civilization II or American History I or American History II	3/0	3	45
AAS - Industrial Instrumentation & Electrical Technology			63	1770

Course Descriptions
BIOL 1010 General Biology I

This course introduces non-majors to science through a study of the basic principles of biology and will focus on the unity and diversity of life. The topics will include biological chemistry, metabolism, cell biology, molecular biology, genetics, evolution, and ecology.

ENG 1015 English Composition

This course focuses on drafting and revising academic writing assignments that will guide you through the research process in preparation for writing one longer persuasive research essay. All writing assignments emphasize the importance of writing processes, such as brainstorming, drafting, and revising.

HIST 1010 Western Civilization I

This course is surveying the periods from to the earliest cultures to 1648 and includes the contributions of the Romans and the Christian church, feudalism and rise of national states and ends with the Renaissance and Reformation.

HIST 1020 Western Civilization II

The purpose of this course is to provide an overview of the major political, social, and economic transformations that have shaped the world from the period following the Reformation to today. They will look closely at the ways in which societies and individuals have responded to changes through time.

HIST 2010 American History I

A survey of American history through the pre-Columbian, colonial, revolutionary, early national, slavery and sectionalism, and the Civil War/Reconstruction eras.

HIST 2020 American History II

This course is a survey of American history beginning after reconstruction including industrial expansion and related problems, imperialism, World War I and aftermath, depression and New Deal, World War II, and the area of growth and expansion since the war.

IJET 1012 Industrial Tools & Calculation

This course is an introduction to the tools, mathematics, and measurements commonly used in the fields of Instrumentation and Industrial Electricity.

IJET 1022 Electrical Circuits I

This course will introduce the concepts of DC circuits theory; mesh and nodal analysis, network theorems, Kirchhoff's Laws, single time-constant transients, and Thevenin's and Norton's equivalents for DC circuits. Practice: Exercises that demonstrate and reinforce theoretical DC circuit concepts. Skills in component recognition, component value identification and proper test equipment usage are emphasized.

IJET 1032 Electrical Circuits II

This course is an extension of concepts developed in 1022 to include sinusoidal steady state analysis of alternating current circuits, including, capacitance, inductance, reactance, impedance, true and apparent power. Practice: exercises that demonstrate and reinforce theoretical AC circuit concepts. The proper use of AC test equipment is emphasized including Oscilloscopes.

IJET 1212 Electronic Circuits Theory & Practice

This course is an introduction to solid state devices, diodes, transistors, special purpose diodes thyristors, FET devices, VDR, and optical devices. Includes testing, analyzing, troubleshooting,

and repairing using technical manuals. This course covers half wave, full wave, and bridge rectifier circuits. Also covers regulated and switched power supplies, amplifier fundamentals, and the theory of oscillation. Includes component identification.

IJET 1222 Electrical Power Theory & Practice I

This course is an introduction to basic voltage sources and electrical circuits commonly used in commercial applications. Students will create electrical schematics and install wiring and electrical components, following the National Electrical Code (NEC) guidelines. Students will demonstrate operation of circuits and troubleshoot circuits when necessary.

IJET 1232 Electrical Power Theory & Practice II

This course is an introduction to industrial wiring applications, including installation of EMT and rigid conduit. Use of the National Electric Code (NEC) as it applies to these applications and OSHA guidelines for safe installation.

IJET 1243 Industrial Electrical Power Theory & Practice I

This course covers concepts of Safety, Basic Motor Control Principles and Components, Schematic Diagrams, Motor Connections, and the installation and troubleshooting of motor control circuitry using industry standards.

IJET 1253 Industrial Electrical Power Theory & Practice II

Advanced concepts of motor control applications, including timers, liquid level control, and variable speed drives. Design, installation, and operation of control circuits using these devices. Use of safety procedures in all installation and operation. Troubleshooting of control circuits.

IJET 2014 Control Systems Theory & Practice

This course covers the software, hardware, and associated equipment that students will need to become proficient with to install, program, and maintain industrial programmable controllers.

IJET 2024 Instrumentation Process Measurement Theory & Practice I

This course will introduce the concept of pressure and level calculations, sensing devices, and perform pressure and level measurements. Also included are troubleshooting techniques.

IJET 2034 Instrumentation Process Measurement Theory & Practice II

This course will introduce the concept of temperature and flow calculations, sensing devices, and perform temperature and flow measurements. Also included are troubleshooting techniques and calibration procedures.

IJET 2043 Instrumentation Control Systems Theory & Practice I

This course is designed to introduce the student to the concepts and practices of process control and the associated instrumentation and hardware that can be involved in controlling process variables. There are hands-on applications where students will be interactive with various control elements and the disassembly, assembly, repair and calibration of these control type elements.

IJET 2053 Instrumentation Control Systems Theory & Practice II

This course is designed to continue the student's education on process control including various control methods, control elements, process tuning, and the implementation of primary, final, and control elements to use in automatic control. There are hands-on applications where students will be interactive with various control elements and the disassembly, assembly, repair, and calibration of these control type elements.

IJET2063 Integrated Control System Troubleshooting

This course is designed to continue the student's education on process control including various control methods, control elements, process tuning, and the implementation of primary, final, and control elements to use in automatic control. There are hands-on applications where students will be interactive with various control elements and the disassembly, assembly, repair, and calibration of these control type elements.

LEAD 1003 Work Readiness

This course is designed to prepare for job readiness by reviewing the skills necessary for employment, including time management, communication, teamwork, and professionalism. The student will engage in a variety of skill-building activities, create a resume, participate in a simulated interview process, and review basic math and English skills necessary for their chosen program of study.

MATH 1015 College Algebra

Topics from algebra including complex numbers; radical and rational equations; linear and quadratic equations and inequalities, absolute value equations and inequalities; lines and slope; graphs; inverse, exponential, and logarithmic functions; systems of equations and inequalities; conics; applications.

MATH 1300 Contemporary Mathematics

This course is designed as an introduction to topics in contemporary mathematics. Topics will vary but may include problem solving and reasoning, set theory and Venn diagrams, perspective and symmetry in art, graph theory, elementary number theory, optimization, numeracy in the real world, geometry, and apportionment and voting methods.

PHSC 1015 Physical Science I

This course is designed to survey the wonders of the physical universe through a study of kinematics, Newton's laws of motion, rotational motion, fluids, thermodynamics, waves, the solar system, and other key topics in astronomy. Not intended for science and engineering majors.

PSYC 2015 Introduction To Psychology

This course is designed to provide you with an introduction to psychological theory and research. Topics considered include the nature of psychology and its history, research practices, learning and conditioning, developmental psychology, personality, social psychology, psychopathology, and psychotherapy.

SPCH 1015 Fundamentals of Communication

Study and application of basic principles of effective extemporaneous speaking, including audience analysis and adaptation, topic selection, research, organization, and presentation skills. Students deliver, listen to, and critique a variety of speeches. This course is intended to give the beginning student an understanding of and practice in public speaking.

WKSF 1003 Industrial Workplace Safety

This course will provide an overview of the construction industry by examining organizational structures and systems, safety regulations and agencies, construction documents, office and field organizations, and the various construction crafts and trades. This course will focus on the basic knowledge and skills needed in the construction industry by studying safety, math, hand tools, power tools, rigging, blueprint reading, communication, and employability.